Highlights
Dec. 1, 1958
Vol. 1, No. 11

* AIR-BREATHING MISSILES
* IGY ACCOMPLISHMENTS
* AIR FORCE SPENDING
* PHOTON PROPULSION
* COMPUTER ENGLISH
* RESEARCH CHECKLIST

Washington SCIENCE TRENDS

AIR-BREATHING MISSILES may be the next to feel the sharp budget cuts threatened for the new military budget. Programs in jeopardy are said to include the Mace, Army-Martin Co.; the Regulus, Navy-Chance-Vought and the Snark, Air Force-Northrop Aircraft. Pentagon sources told Washington Science Trends that each of these programs are undergoing critical re-evaluation. The missiles each have the advantage of accuracy and reliability but many officials believe funds should be shifted toward the faster ballistic missiles now coming along.

* * *

INTERNATIONAL GEOPHYSICAL YEAR officially ends this month although arrangements are being made to carry on in such fields as antarctic, oceanographic and space research. Here, for reference purposes, are some of the IGY accomplishments U.S. officials believe to be of most significance:

1. The discoveries that solar x-radiation, rather than ultraviolet radiation, controls the ionospheric layers, and that its source is the sun's corona.

2. The first extensive mapping of the contours of the continent-island complex which lies beneath the Antarctic ice-cap.

3. The acquisition of data permitting substantial revision upwards of the volume of the world's ice affecting world climate.

4. The discovery of great, deep counter-currents in the Atlantic and Pacific, adding materially to our knowledge of ocean circulation systems.

5. The discovery of the Van Allen radiation belt.

6. The first successful launchings of earth satellites.

7. Determination that the earth's outer atmosphere is over ten times denser than had been thought.

8. Great advances in mapping the ocean bottoms, and the correlation of heat flow through the ocean floor with bottom contours.

9. Making available the first overview of the Antarctic weather system.

10. Observations tending to prove the electrojet theory.

11. Observations of auroras, confirming their relationship to solar disturbances and correlating boreal and austral displays.

12. Observations of cosmic ray incidence, indicating a skewing of the cosmic ray "equator" and suggesting the existence of magnetic fields in space.

1120 NATIONAL PRESS BUILDING • WASHINGTON 4, D. C. MEtropolitan 8-6699

AIR FORCE SPENDING: Here is a valuable long term view of USAF spending plans as expressed by Under Secretary Malcolm A. MacIntyre:

"The Air Force appropriation for the current calendar year is approximately 4 percent of the gross national product. This percentage should not increase. In fact, as the annual national income rises the percentage devoted to buying and supporting a high quality Air Force actually should decrease. In other words, the yearly outlay for the Air Force should rise very slightly over the next five to ten years.

"Notice, however, I use the word 'should.' With future weapons systems requiring an ever increasing number of engineering man hours, and with per system prices going up as a result of short orders which permit limited amortization of development and overhead costs, total expenditures might tend to rise sharply.

"Careful management by Air Force people and full cooperation from industry are the most effective controls available, short of legislative restrictions. Should decrease can be changed to will decrease provided management excercises thoughtful, long-range control."

* * *

PENTAGON NOTEBOOK: Air Force is making a determined behind-the-scenes attempt to take over control of the Navy's anti-submarine duties. The argument being used is that missile and rocket carrying submersibles present a threat to Continental U.S. and should be an Air Force defense responsibility...Another Air Force project -- a change of name to something such as U.S. AeroSpace Force...Army attempt at a Lunar Probe scheduled for late this week.

COMMITTEE ON ATMOSPHERICS has been formed by the National Academy of Sciences. New chairman will be Dr. Paul E. Klopsteg, consultant, Glenview, Ill. New members include Dr. Fred L. Whipple, Chairman, Department of Astronomy, Harvard University; Dr. Michael Ference, Jr., Chief Scientist, Ford Motor Co. and Dr. John Tukey, Professor of Mathematics, Princeton, N. J.

* * *

ESCAPE CAPSULE TEST at Wright Air Development Center has been proclaimed a success. The research capsule is a bullet-shaped container about 12 feet long and about four feet at its thickest point. It was designed to provide a closed, protected device which could be ejected from future supersonic aircraft. The three day experiment was conducted in a testing pool. An Air Force volunteer, confined to the space available in an average household refrigerator, remained in a sem-inclined position, performed "survival tasks" and made periodic radio reports on his physical condition and comfort.

Air Force says the capsule concept follows its "shirt-sleeve-environment" philosophy in which the pilot need not be hampered by heavy gear. Instead he wears a simple, summer weight flying suit, G-Suit and lightweight helmet.

PHOTON PROPULSION for spaceflight applications has been stymied by three major scientific and engineering problems, according to a Soviet technical discussion made available in Washington this week.

Russian engineer Yu. Sushkov, otherwise unidentified, reports these major obstacles to the development of photon motors for the development of thrust through light pressure:

(1) "The transformation of matter into radiation. At present, antiparticles can be produced in elementary particle accelerators. The encounters of antiparticles with electrons form photons. These reactions will be of practical value when scientists can find economical methods for producing antiparticles and develop methods for their accumulation and storage.

(2) "The Conversion of the wave lengths of the radiation. The reason for this is that 'firm' short wave gamma radiation is formed in the reaction. At present, there is no known material from which it would be possible to make mirrors for reflecting gamma rays. Therefore, along with the search for methods of reflecting them, it is necessary to work on the conversion of gamma photons into light photons, that is, on increasing the wave length of the radiation.

(3) "The cooling of the mirror and the 'combustion chamber'. For the light pressure on the mirror surface to consist of one atmosphere, the necessary flow of energy must be about one million kilocalories for each square centimeter per second. Therefore, the mirror...will be greatly heated even if only a slight portion of the radiation energy is converted into heat."

Shuskov declares that it is theoretically possible to build a photon motor using thermonuclear reactions. He declared that in theory, such a motor could develop a thrust of 210 tons if a kilogram of hydrogen is converted into helium each second.

* * *

UNIVERSAL COMPUTER LANGUAGE has been developed by the U.S. Bureau of Public Roads to aid in the solution of highway construction problems. The "universal language" is designed to permit state highway departments and consulting engineers to use any of a dozen different types of computers to solve construction difficulties.

> Each "book" in the new library is a primer on the solution of a particular problem and comprises a program of instruction for a computer. An engineer tackling a similar problem elsewhere receives a copy of the translated program, codes the instructions for the computer in his own office and adds the dimensions and other particulars concerning his own task.

Officials have so far acquired about 180 programs. When received, they include abbreviations and symbols that work in one type of computer but not in others. The Bureau has translated 16 of these into the plain English and figures of the "universal language" and translations of the remainder are now underway.

( ) Space Science and Exploration, a new bibliography citing 2274 references to published unclassified information on astronautics covering the period 1903 through June 1958. Includes references to books, periodicals and research reports. 278 pages. $4. (Write Office of Technical Services, U.S. Department of Commerce, Washington 25, D.C. for Publication PB 131755)

( ) FEDERAL AGENCIES FINANCING RESEARCH, a partial listing and guide to research programs and policies with emphasis on grants and contracts. 22 pages. $1. (Write Social Legislation Information Service, 1346 Connecticut Avenue, Washington 6, D.C.)

( ) Defense Education Act, a summary and explanation of the new aid to education law, including details on laboratory equipment projects, science information program and assistance in science education. 34 pages, 15 cents. (Write Publications Services, U.S. Department of Health, Education and Welfare, Office of Education, Washington 25, D.C. for School Life, Oct.-Nov., 1958)

( ) International Medical Research, a compilation of background materials including information on international research contributions, a study of scientific communication and a brief review of U.S. Research. 117 pages. Free. (Write Subcommittee on Reorganization, Committee on Government Operations, Senate Office Building, Washington 25, D.C.)

( ) Security in the Nuclear Age, a U.S. Navy plea for more nuclear aircraft carriers. 31 pages. Free. (Write Advertising and Publicity Manager, Newport News Shipbuilding and Drydock Co., Newport News, Va.)

( ) Information for Scientists, a brief study of "a national program for increasing the availability of the results of scientific research". 11 pages. Free. (Write National Science Foundation, Washington 25, D.C. for Publication NSF 58-34)

( ) Gas Chromatography, a bibliography of more than 500 references to reports and talks relating to the theory and use of gas chromatography in the laboratory and the plant. 40 pages. Free. (Write Publications Distribution Section, U.S. Bureau of Mines, 4800 Forbes St., Pittsburgh, 13, Pa. for Publication 7856)

( ) High Precision Balances, a government program to develop a photoelectric device that automatically and continuously indicates the position of the swinging beam of a high-precision balance. (Details from National Bureau of Standards, Office of Technical Information, Washington 25, D.C.)

( ) Wire Springs used to control detonation in many ordnance items can be tested for performance and reliability under new techniques developed for Army Ordnance. (Details from National Bureau of Standards, Office of Technical Information, Washington 25, D. C.

( ) Grants and Fellowships, an extensive report on research facilities grants, research fellowships and research grants awarded by the National Institutes of Health. 311 Pages, Single copies free. (Write Public Inquiries Branch, Office of Information, Public Health Service, Washington 25, D.C. for Publication No. 624)

A privately circulated non-technical report available by subscription. One year, $40. Two years, $70. Write for information on international, bulk and gift rates. Mailed each Friday at Washington, D. C. by First Class Mail. Air Mail rates $5 per year additional. All contents protected by copyright. Reproduction prohibited except by special permission.